CHAPTER 4

Long-Term Forecast of Washington Personal Income

TRENDS IN WASHINGTON PERSONAL INCOME reflect the pace of the state's economic and population growth. For private businesses, the size and composition of personal income provide a good measure of markets and consumer demand. For governments, personal income is an important parameter in monitoring state economic conditions, anticipating tax revenues, and assessing the level of services required.

Per capita personal income is often used as an indicator of economic well being of the state residents. Trends in state per capita income reflect local economic growth, population characteristics, poverty status, business climate, standard of living, and the state's obligation and ability to provide adequate public services (i.e. the means-tested entitlement programs).

Total Personal Income Trends

In 2000, total personal income in Washington was $173.8 billion. After adjusting for inflation, total state personal income in 2000 was more than three times its 1970 level, with an average annual growth rate of 4.1 percent over the past three decades. Total personal income in the state, in constant 1996 dollars, is projected to grow an average 3.3 percent a year between 2000 and 2025. This future growth represents a significant slowdown from the level that the state experienced in the past. The predicted slowdown in income growth reflects the expected lower increases in the state population and real per capita income. The latter factor roughly reflects the projected slowdown in labor force growth that will be partially offset by the expected productivity increase.

Washington State in 2000 accounted for 2.3 percent of total personal income in the nation, a significant increase from the 1.7 percent share in 1970. The increased share reflects the fact that the state economy and population have been expanding faster than the nation as a whole. Economic and population growth in the state is expected to be more synchronized with the nation in the future and, by 2025, about 2.4 percent of the nation's total personal income is forecasted to be in the state (Figure 4-1).

Personal income growth fluctuates with business cycles. Long-term personal income growth in Washington closely mirrors the national trend, but with more erratic and volatile short-term movements (Figure 4-2). However, volatility in state personal income trends seems to have abated since the mid-1980s. The trend toward more stable income growth is attributable to the declining role of cyclical industries and the growing diversification of the Washington economy.

Figure 4-1
Total Personal Income: Washington, 1970-2025

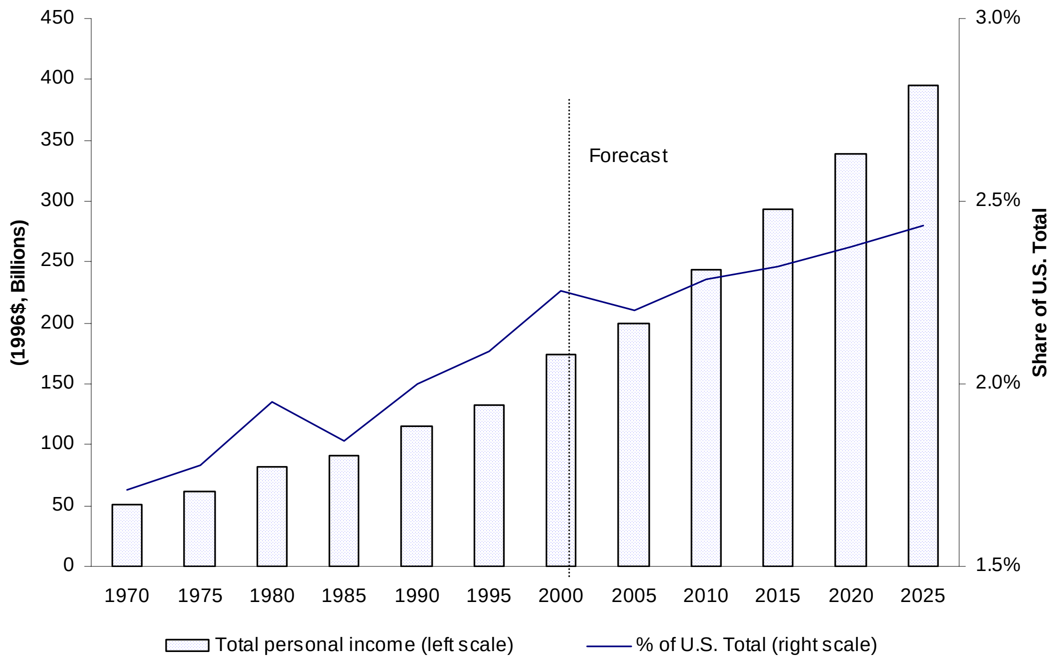

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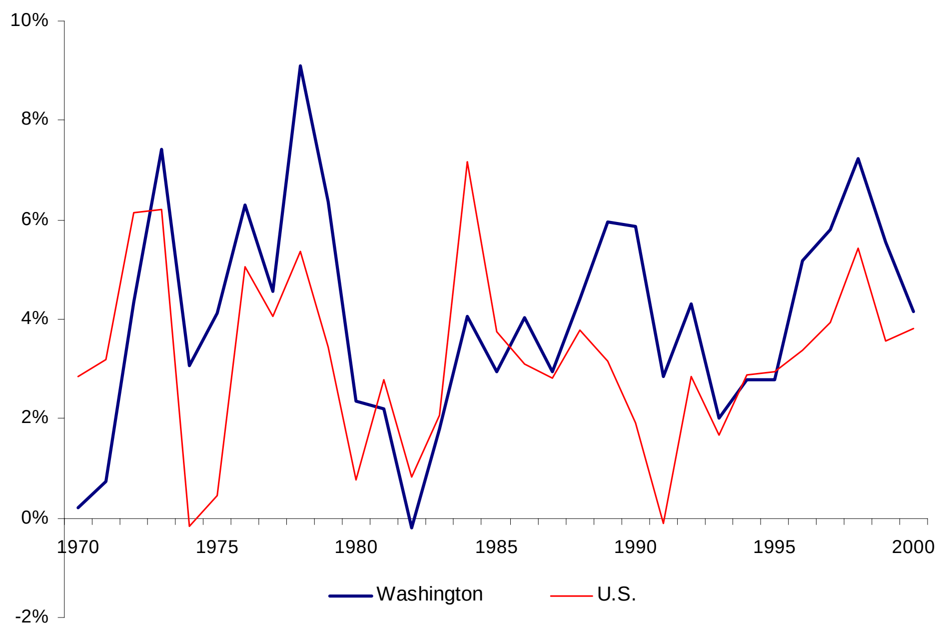
Figure 4-2
Annual Change in Total Real Personal Income



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Income Growth by Component

Personal income, as defined by the Bureau of Economic Analysis, has three major components: (1) earnings (wages, other labor income, and proprietor's income); (2) dividends, interest, and rent; and (3) government transfer payments. In 2000, earnings accounted for 73 percent of total personal income in Washington; and dividends/interest/rent and transfer payments represented 19 and 11 percent of total personal income, respectively. These three income components have been growing at varying rates over the past three decades (Table 4-1).

- **Earnings.** Washington real total earnings (in 1996 constant dollars) tripled from 40.0 billion in 1970 to 126.4 billion in 2000. The average annual growth rate of earnings was 3.9 percent, lower than the 4.1 percent rate for total personal income growth. Earnings growth is, understandably, subject to cyclical factors. The annual rate of real earning growth in the state has dipped to as low as -3.2 percent during the 1969-70 period, and has risen to a high of 9.9 percent in 1977-78.

  In the first half of the 1990s, growth in total earnings in Washington significantly slowed. The 1.8 percent annual increase in 1993-95 was the lowest earnings growth the state has experienced since the 1982-83 recession period. Cutbacks in the aerospace industry were the major culprit for the mediocre performance. The earnings growth then rebounded strongly to 6.7 percent per year in the 1995-99 period, but again slowed to 2.9 percent in 2000.

Table 4-1
Real Income Growth by Component: Washington

	Average Annual Growth Rate (%)						
Income Components	1970-75	1975-80	1980-85	1985-90	1990-95	1995-00	1970-2000
Total Personal Income	3.9	5.7	2.2	4.6	2.9	5.6	4.1
Earnings	3.4	5.5	0.9	4.9	2.8	6.1	3.9
Dividends, Interest, and Rent	3.6	9.1	6.1	4.6	1.8	5.8	5.1
Transfer Payments	8.1	3.3	4.8	3.8	5.9	1.9	4.6

Earnings growth has also varied significantly among industries (Table 4-2). Farm income in real terms has been flat since 1970, and its share of total earnings in the state declined from 3.2 percent in 1970 to 0.9 percent in 2000. Real earnings from manufacturing increased 96 percent, but its share of total earnings declined slightly from 23 percent in 1970 to 20 percent in 1990, and to 14 percent in 2000.

Despite substantial job gains, retail and wholesale trade has shown only modest growth in earnings. Actually, retail and wholesale trade earnings as a share of total earnings declined from 17 percent in 1970 to 15 percent in 2000 -- a result of these sectors' low wages and slow wage growth. Real earnings from the services industry increased six fold over the 1970-2000 period, increasing at an annual rate of 6.7 percent -- far above the 3.9 percent growth rate for total earnings. Services cover a wide range of sectors and occupations. Earnings in services started accelerating in the second half of the 1980s, as more growth took place in the high-paying sectors of this industry such as business and health services. In the second half of the 1990s, the strong economy, accompanied with a soaring equity market, raised the earnings growth to a 10.6 percent annual rate.

Since earnings are such a large proportion of total personal income, a special section at the end of this chapter is devoted to analyzing the sources of changes in average earnings over the past two decades.

Table 4-2
Growth in Real Earnings by Industry: Washington

	Average Annual Growth Rate (%)						
	1970-75	1975-80	1980-85	1985-90	1990-95	1995-00	1970-2000
Total Earnings	3.5	5.5	0.9	4.9	2.8	5.9	3.9
Farm	13.4	-7.9	-8.2	3.6	0.6	-2.5	-0.5
Manufacturing	1.7	6.9	-1.1	4.5	-1.1	2.6	2.2
T.C.U.	2.8	5.4	0.8	3.6	4.7	5.0	3.7
Wholesale & Retail	3.7	4.6	1.2	3.5	2.7	5.4	3.5
F.I.R.E.	1.2	8.5	0.5	6.9	5.4	7.4	4.9
Services	4.5	8.1	3.9	7.8	5.6	10.6	6.7

T.C.U.=Transportation, Communication, and Utilities. F.I.R.E.=Finance, Insurance & Real Estate.

- **Dividends, interest, and rent.** The proportion of total personal income derived from property- and saving-related income sources increased steadily from 14.3 percent in 1970 to 19.0 percent in 2000. The share of income from these sources increased in the 1980s due in part to high interest rates early in the decade. Soaring property value in the second half of the decade added to this growth. Between 1990 and 1995, real income from dividends, interest, and rent grew at an annual rate of 1.8 percent in the state, far lower than the long-term average of 5.1 percent. From 1995 to 2000, this component of personal income rebounded to an annual growth rate of 5.8 percent, due mainly to the rising real estate property value/rent in the state.

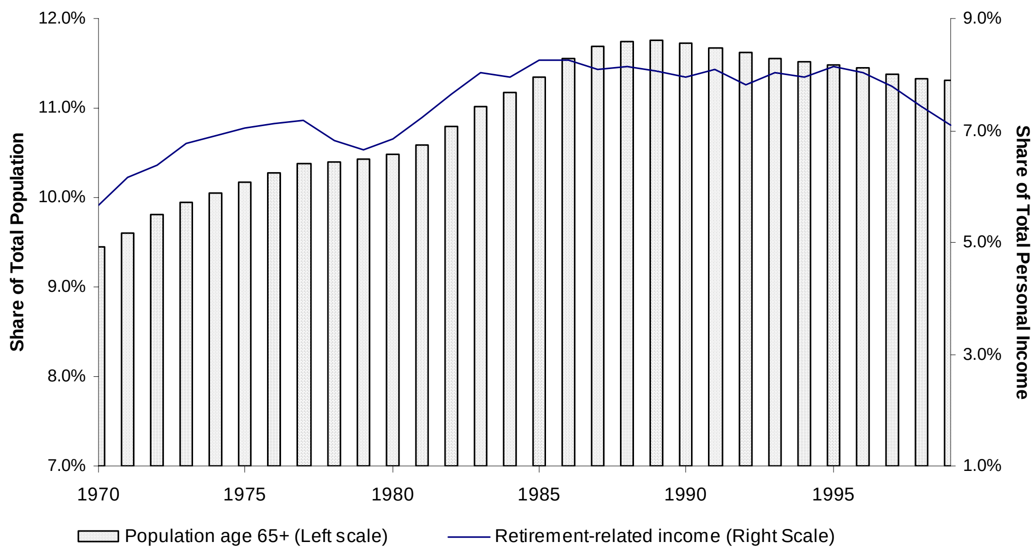
  In the short term, income from dividends, interest, and rent is affected mainly by monetary and cyclical factors. Over the long run, it reflects past earnings and savings behavior. The future growth of this component of personal income thus depends on the state's ability to retain and attract families with the ability and propensity to save and invest.

- **Transfer payments.** The importance of transfer payments as a source of personal income has increased in the past three decades. In Washington, total transfer payments in real terms increased at an annual rate of 4.6 percent. Transfer payments as a share of total personal income increased from 10.0 percent in 1970 to 13.6 percent in 1995, and then declined to

11.4 percent in 2000. The growth of transfer payments reflects the impact of the government policies dealing with social security, welfare, and unemployment.

In 1999, about 58 percent of total transfer payments in the state were retirement and disability insurance benefits and Medicare payments. The level of transfer payments is affected by the state's demographic profile and relevant state and federal regulations (Figure 4-3). Aging of the population in the next few decades should contribute to the growth of this component of personal income.

Figure 4-3
Elderly Population and Retirement-Related Payments*



*** Includes government retirement and disability insurance benefit payments, and Medicare payments to individuals.**

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A significant portion of transfer payments is counter-cyclical in nature. In Washington, income derived from income maintenance and unemployment insurance benefit payments accounted for as high as 28.1 percent of total transfer payments during the cyclical trough in 1971, and as low as 12.9 percent in 1990 when the state economy peaked in the last business cycle. The share rose to 13.2 in 1999.

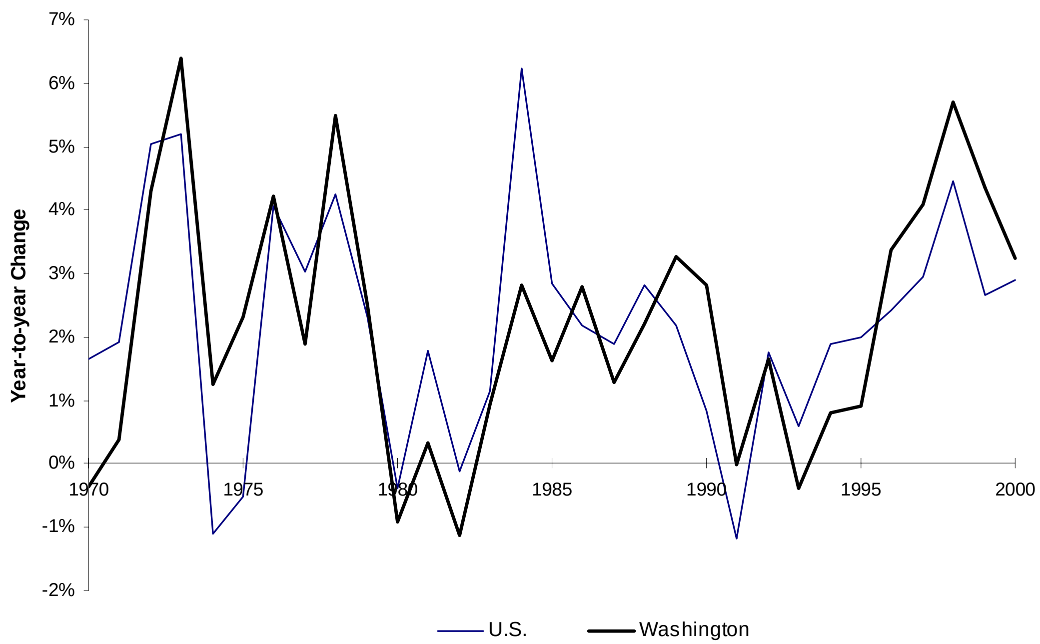
Per Capita Income Trends

Real per capita income is derived by dividing total state personal income by total population in the state, then adjusting for inflation using the Implicit Price Deflator (IPD) for personal consumption from the National Income and Product Account (1996 = 1.0).

In 2000, real per capita personal income for the state was estimated at $29,376, which was about 5.0 percent above the U.S. average of $27,977. The state real per capita income in 2000 nearly doubled its level in 1970.

Between 1970 and 2000, Washington State real per capita personal income grew at an average annual rate of 2.3 percent. The growth did not follow a smooth path, but fluctuated along with the prevailing state economic conditions. During most of the expansionary periods, state per capita personal income rose faster than the U.S. average. Conversely, per capita income growth in the state usually plummeted below the national trend during recessions or periods of slow economic growth (Figure 4-4).

Figure 4-4
Annual Changes in Real Per Capita Income



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In the past, growth in the state's aerospace industry, along with the industry's high wages and salaries, played a major role in the growth of Washington personal income. This was evident during the 1965-70 period when real per capita income in the state increased nearly 4.5 percent per year. On the other hand, the 1980-82 national recessions were particularly hard on the Washington economy. The state economy was hit severely and remained in recession for a longer period than the national economy, resulting in a decline in real per capita income.

Since the mid-1970s, growth in real per capita personal income has slowed, both in the state and in the nation. The slowdown in per capita personal income growth was more severe in the state than the nation through most of the 1980s. However, since 1988 the state has gained some ground relative to the nation in per capita income growth.

At the national level, the most commonly cited reason for sluggish personal income growth is the slowdown in productivity growth. This factor certainly also played a significant role in the earnings and income changes in the state. In addition, the state economy suffered from the collapse of non-oil commodity prices during the 1970s and the early 1980s that hurt its resource-based industries. Other contributing factors include the appreciation of the dollar in relation to foreign currencies in the first half of the 1980s that affected sales and employment in the state's export industries. The rise in real interest rates in the 1980s also contributed to lower demand for Washington's durable goods products. Two local events in the early 1980s -- the sudden termination of the Washington Public Power Supply System construction project and the loss of jobs in the shipbuilding sector -- exerted large, negative effects on state earnings and personal income. By 1985, the state per capita income was 0.6 percent below the national average.

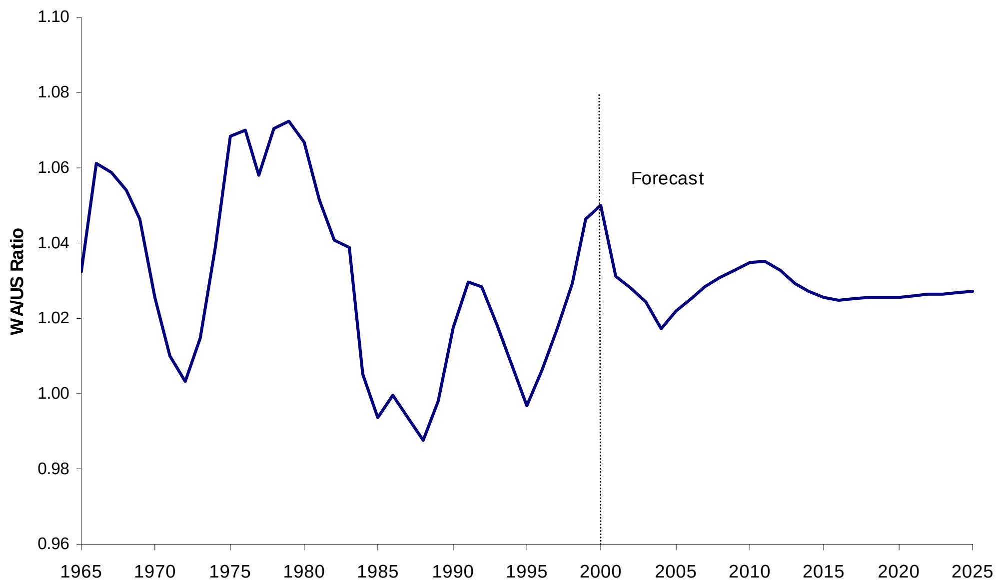
In the second half of the 1980s, Washington experienced substantial job growth in aerospace and the high-tech manufacturing industries. At the same time the state saw significant growth in the evolving high-wage "knowledge-based" service sectors. In addition, Washington's export industries were aided by a decline in the value of the dollar relative to other currencies. As a result, real per capita income grew faster in the state than in the nation. In 1990, real per capita income in the state rose to a level 2.0 percent above the national average.

The state's economy was at full strength in 1990 when the U.S. economy was entering into a recession. In 1991, the aerospace sector started cutting back production to accommodate a shrinking commercial aircraft market. The negative income effect of the aerospace reduction offset to a large extent the income growth brought about by other prospering sectors (e.g., machinery manufacturing and business services) in the state. Real per capita income growth in Washington thus slowed down in the early 1990s, although the nation as a whole suffered an even greater drop in income growth. Between 1993 and 1995, the Washington economy stalled due to on-going job reductions in aerospace, while at the same time the national economic recovery picked up pace. Per capita income growth in the state relative to the U.S. average thus deteriorated during this period.

The Washington economy has accelerated strongly since 1995. Manufacturing employment increased 5.7 percent from 1995 to 2000. Besides strong national economic growth that raised the demand for goods produced in the state, two-thirds of the manufacturing growth came from hiring at Boeing to accommodate surging airplane orders. By 2000, job growth in Washington was broad-based, covering both manufacturing and non-manufacturing sectors of the economy. Consequently, the state unemployment rate dipped to 5.2 percent, far below the average of 7.6 percent in the past three decades; and the employment-to-population ratio rose to a historic high. All of these have contributed to a big jump in per capita income growth.

Over the long run, per capita income in Washington has trended closely with the national average. State per capita income averaged 3 percent above the national level during the 1970-95 period. However, the volatility of certain manufacturing and resource-based industries in the state periodically narrowed or widened the per capita income gap between Washington and the nation. In 2000, the state per capita income was 5 percent above the national average, a record high since the late 1970s (Figure 4-5).

Figure 4-5
Ratio of Washington to U.S. Per Capita Income



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Outlook for Personal Income Growth in Washington

In the next 25 years, the Washington economy is expected to continue its diversification, with an industrial profile moving close to that of the nation. This development means that the state will likely experience more stable economic growth, thus less volatility in its personal income trends. But does this mean that the states per capita income level will converge to the national average in the future?

Long-term projections of state personal income suggest that Washington per capita personal income level will remain above the national average over the forecast horizon. But the gap between the state and the nation will narrow. Several factors contribute to the comparative strength of Washington's per capita income outlook:

- In the two and a half decades after 2000, worldwide aircraft demand is expected to remain strong.
- Washington will maintain a relatively strong manufacturing base. For example, agriculture and food products in the state will continue to benefit from the improving access to

worldwide food markets; and these markets are expected to expand as a result of increasing consumption by rapidly growing Pacific Rim economies.

- The state's high wage durable goods and high-technology industries will benefit from the expected macroeconomic trends toward lower and more stable real interest rates, accompanied by increasing international demand for capital goods.
- A more integrated global economy will help expand state exports and stimulate export-related business activities. Furthermore, Washington has the geographic advantage that endows it with great potential to attract foreign investments.
- Recent business expansion and investment activities in the state suggest that the state has had the critical mass to continue attracting a variety of high-tech manufacturing and knowledge-based business service industries. The growth of high wage jobs in these industries will help raise the states per capita income.

The per capita income projection model, which is used to forecast state personal income growth, incorporates the above factors that are critical to explaining per capita income growth in Washington compared to the nation.

Per Capita Income Growth Trend

Between 1970 and 2000, real per capita income in the state grew at an average 2.3 percent per year. In the next 25 years, real per capita income growth is expected to slow to an annual rate of 2.1 percent (Figure 4-6). The projected lower growth rate is caused by the expected decline in labor force growth and lowering of the employment-to-population ratio, both resulting from an aging population. These negative factors are somewhat offset by the expected productivity growth. The same trends will prevail nationally.

Table 4-3 shows the long-term personal income forecasts for Washington and the U.S.

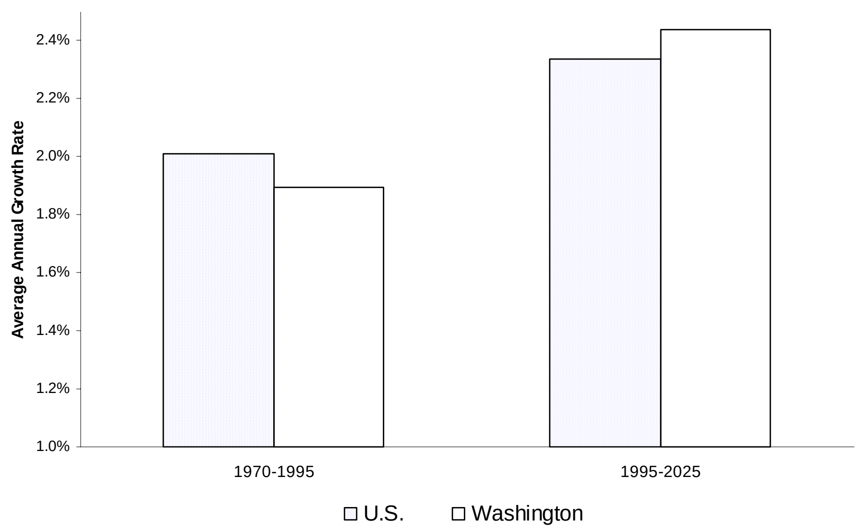
Table 4-3
Personal Income Trends: Washington and U.S.

Year	Total Real Personal Income (1996 Dollars) Washington (Billions)	Annual Change (%)	U.S. (Billions)	Annual Change (%)	Per Capita Income (1996 Dollars) Washington	Annual Change (%)	U.S.	Annual Change (%)
1975	62.20	4.1	3,503.96	0.5	17,310	2.3	16,205	-0.5
1976	66.13	6.3	3,681.33	5.1	18,041	4.2	16,862	4.1
1977	69.14	4.6	3,831.24	4.1	18,382	1.9	17,372	3.0
1978	75.43	9.1	4,037.31	5.4	19,389	5.5	18,112	4.3
1979	80.23	6.4	4,176.74	3.5	19,875	2.5	18,530	2.3
1980	82.10	2.3	4,208.74	0.8	19,695	-0.9	18,461	-0.4
1981	83.91	2.2	4,326.04	2.8	19,758	0.3	18,789	1.8
1982	83.76	-0.2	4,361.45	0.8	19,533	-1.1	18,763	-0.1
1983	85.27	1.8	4,452.33	2.1	19,716	0.9	18,982	1.2
1984	88.75	4.1	4,771.81	7.2	20,274	2.8	20,166	6.2
1985	91.35	2.9	4,951.47	3.8	20,605	1.6	20,739	2.8
1986	95.04	4.0	5,105.29	3.1	21,182	2.8	21,191	2.2
1987	97.85	3.0	5,248.74	2.8	21,453	1.3	21,592	1.9
1988	102.16	4.4	5,446.77	3.8	21,928	2.2	22,202	2.8
1989	108.24	6.0	5,619.24	3.2	22,643	3.3	22,687	2.2
1990	114.60	5.9	5,726.10	1.9	23,280	2.8	22,876	0.8
1991	117.85	2.8	5,719.67	-0.1	23,275	0.0	22,607	-1.2
1996	122.93	4.3	5,883.13	2.9	23,660	1.7	23,003	1.8
1993	125.39	2.0	5,980.37	1.7	23,569	-0.4	23,142	0.6
1994	128.87	2.8	6,152.06	2.9	23,761	0.8	23,577	1.9
1995	132.46	2.8	6,334.05	3.0	23,976	0.9	24,049	2.0
1996	139.32	5.2	6,547.32	3.4	24,782	3.4	24,629	2.4
1997	147.42	5.8	6,804.85	3.9	25,792	4.1	25,357	3.0
1998	158.06	7.2	7,173.46	5.4	27,262	5.7	26,488	4.5
1999	166.85	5.6	7,429.77	3.6	28,451	4.4	27,190	2.6
2000	173.79	4.2	7,713.20	3.8	29,376	3.3	27,977	2.9
Forecast								
2005	199.26		9,048.23		32,094		31,408	
2010	244.29		10,681.53		36,814		35,577	
2015	293.02		12,615.25		41,379		40,349	
2020	338.23		14,243.61		44,911		43,784	
2025	395.65		16,266.47		49,393		48,092	

Average Annual Growth Rate (%)

2000-2005	2.8	3.2	1.8	2.3
2005-2010	4.2	3.4	2.8	2.5
2010-2015	3.7	3.4	2.4	2.5
2015-2025	2.9	2.5	1.7	1.6
2020-2025	3.2	2.7	1.9	1.9
1970-2000	4.1	3.2	2.3	2.2
2000-2025	3.3	3.0	2.1	2.2

Figure 4-6
Real Per Capita Income Growth



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Between 2000 and 2025, real per capita income growth in Washington is expected to average 2.1 percent per year, slightly above the same as the forecast for the nation as a whole. By 2025, real per capita income in Washington will rise to $49,393, about 68 percent above the 2000 level.

Combining per capita income increase with population growth, total state personal income is expected to more than double over the next 25 years, from $173.8 billion in 2000 to $395.7 billion in 2025 (1996 constant dollars). This represents an average annual growth rate of 3.4 percent during the forecast period, higher than the 3.0 percent rate projected for the nation. As a result, Washington's share of total national personal income increases from 2.3 percent in 2000 to 2.4 percent in 2025.

Special Analysis: Trends in Earnings

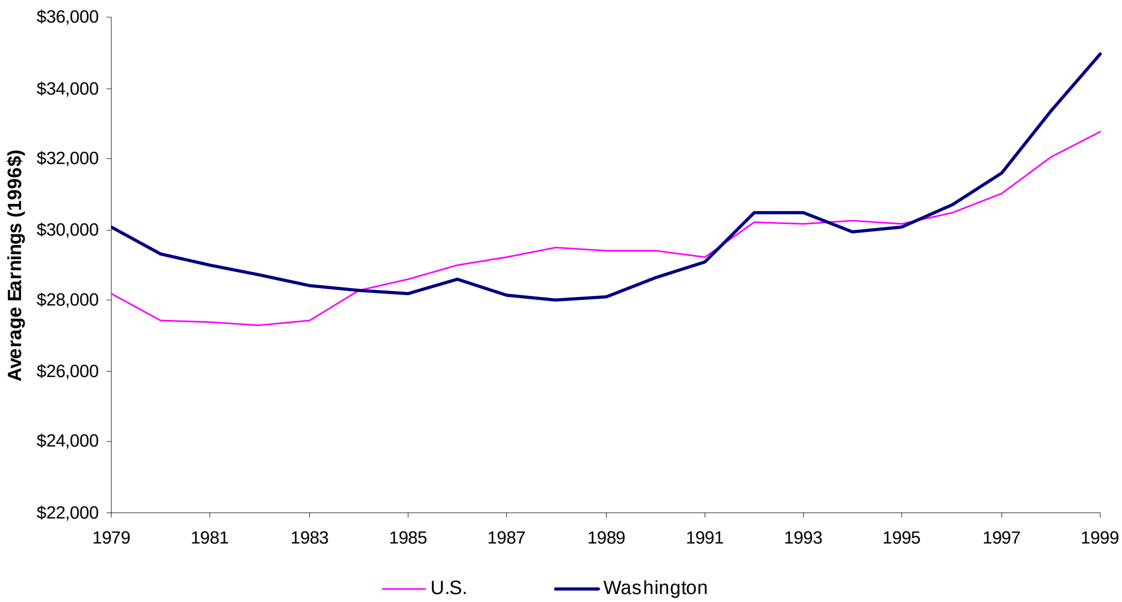
Earnings[1] account for more than two-thirds of total personal income. Changes in earnings thus set the tone for personal income growth. This section explores the sources of earnings changes in Washington over the past 20 years.

[1] The earnings data are estimated by the Bureau of Economic Analysis, U.S. Department of Commerce. Earnings include wage and salary disbursements, other labor income, and proprietors' income. Other labor income consists of the employers' contributions to benefit plans for their employees such as pensions and profit-sharing plans, group health and life insurance, supplemental unemployment insurance, privately administered worker's compensation plans, directors' fees, and other miscellaneous fees. While this definition of earnings does not include the value of all non-wage benefits, it is a much broader definition of compensation than just wage and salary disbursements.

Changes in Real Average Earnings in Washington, 1979-98

Changes in real average earnings in the state have exhibited a different course than the national average. Between 1979 and 1988, the state real average earnings declined relative to the U.S., but in 1988 the trend began to reverse. By 1998, Washington real average earnings were about 4.1 percent above the national average (Figure 4-7).

Figure 4-7
Real Average Earnings: Washington vs. U.S.



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In 1979, Washington real average annual earning in 1996 constant dollars was $30,072; but by 1988, real average earnings in the state dropped by $2,053 to $28,019. During the same period, real average earnings in the U.S. increased slightly from $28,212 to $29,492. In percentage terms, Washington's real average earnings per worker declined by 6.8 percent between 1979 and 1988, while real average earnings in the U.S. increased by 4.5 percent. Consequently, between 1979 and 1988, real average earnings in Washington changed from 6.6 percent above to 5.0 percent below the national average.

Since 1988, however, Washington's average earnings have grown faster than the U.S. average. In 1998, real average earnings in Washington rose to $33,370, representing a gain of $5,348 over the 1988 level. Real average earnings in the U.S. also increased during the period, but only by $2,556. Over the period of 1988 to 1998, the state real average earnings rose by 19.1 percent, compared to the much lower growth of 8.7 percent for the nation as a whole. The earnings recovery in the state was disrupted in the 1993-95 period; but starting in 1996, real average earnings in Washington again exceeded the national average.

The analysis below allocates changes in real average earnings into four components:

- **Industry composition –** Industry composition refers to how jobs are distributed among the industries of the Washington or U.S. economy. Changes in industry composition affect average earnings because wage and earning levels vary among industries. A shift in employment from high-wage to low-wage industries affects aggregate average earnings.

  Over the last two decades both the state and the nation have seen a dramatic change in industry composition. In both economies there has been a shift away from high paying manufacturing jobs toward lower paying retail trade and services jobs. In the 1980s, this shift slowed down the growth of real average earnings in the U.S., but contributed to an actual decline in real average earnings in Washington.

- **Changes in real earnings within industries –** This component, by far, has been the most important contributor to the changes in Washington's real average earnings over the past two decades. Changes in real average earnings within industry sectors can be caused by a variety of factors including new technologies, changes in organizational structures, unionization, labor force supply, product and market changes, or the cyclical performance of the regional, national, and international economies.

- **Incidence of part-time jobs –** Since average earnings are computed by dividing employment (with no regard to part-time or full-time status) into total earnings, an increase in the incidence of part time work would decrease average earnings. Part-time workers typically earn less than full-time workers in the same industry, due to fewer working hours and lower average wage rates. The fact that part-time workers often receive no or only partial non-wage benefits also lowers the earnings of part-time workers in relation to full-time workers. The percentage of part-time jobs relative to full-time jobs has been increasing steadily in the 1980s.

  Trends in part-time employment are also related to changes in industry composition. Manufacturing jobs tend to be full-time. A much higher proportion of jobs in services and retail trade are part-time jobs. The steady loss of high quality, "family wage" jobs has been accompanied by a rise in part-time employment. Many part-time jobs are held by the second wage earners in households. While the entry of secondary household wage earners may have contributed to raising household incomes, to some extent it has also been a response to the decline in real average earnings of primary workers in the households.

- **State versus nation factors –** In addition to the contributions of industry composition, growth in part-time jobs, and earnings changes within industries, this analysis also examines the relative contributions of state and national factors to changes in Washington's average earnings. For example, some changes in industry composition in Washington resulted from national forces affecting all states, while other changes were due to factors particular to Washington. Thus in the analysis, the "industry composition" component of the earnings change is further divided into changes due to national factors verses unique state conditions. A similar distinction is provided for the other two factors affecting real average earnings.

The method used to compute the components of earnings change is depicted in detail in Appendix A of this chapter.

Real Average Earnings Decline in Washington, 1979-88

Washington real average earnings declined by $2,053 from 1979 to 1988. The contributions of each of the four components of change are shown in Table 4-4. The first component, the change in industry composition, is responsible for about 38 percent of the total change. As the breakdown between national and state factors indicates, the change in Washington industry composition was strongly influenced by national trends during this period. This reflects the fact that most of the employment growth in both Washington and the U.S. between 1979 and 1988 took place in the lower wage employment sectors such as services and retail trade.

Table 4-4
Washington Real Average Earnings*: Components of Change (1979-88)

	Change in			
	Industry Composition	Incidence of Part-Time Work	Average Earnings Within Industries	Total Change
State Factors	($16)	($330)	($2,869)	($3,215)
National Factors	($755)	$49	$1868	$1,162
TOTAL	($771)	($281)	($1,001)	($2,053)

*In 1996 dollars.

The second component of change is the incidence of part-time work. There was a large difference in the growth rates of part-time work for Washington and the U.S. between 1979 and 1988. In 1979, Washington and the U.S. were fairly close in the incidence of part-time work. In that year the proportion of Washington workers employed on a part-time basis represented 18.7 percent of total employment. In the U.S. the proportion was 17.8 percent. Over the next ten years, the state’s proportion of part-time employees increased more than the U.S average. By 1988, Washington had 20.5 percent of total employment in part-time jobs, significantly above the 18.6 percent share for the nation. However, as Table 4-4 indicates, this component had a relatively small effect on the change in real average earnings in the state, accounting for only about one-seventh of the 1979-88 decline in real average earnings in Washington.

The third and largest contributor to the earnings decline in the 1980s is the change in real average earnings within industries. Almost half of the decline in real average earnings in Washington could be attributed to this component of change. State factors made a very large negative contribution to this change, which was offset somewhat by positive national changes. From 1979 to 1988, real average earnings declined within virtually all sectors of the Washington economy.

Rebound in Washington Real Average Earnings, 1988-98

The divergence of growth trends in real average earnings between the U.S. and Washington reached its maximum in 1988, since then the state experienced faster earning growth and gradually closed the gap.

As Table 4-5 shows, by 1998 real average earnings in Washington had recovered more than the ground lost in the 1980s. Changes in industry composition continued to have a significant negative contribution to average earnings during the period from 1988 to 1998. However, this negative effect of changing industrial composition on earnings growth was not unique for this state, but occurred nationwide.

Table 4-5
Washington Real Average Earnings*: Components of Change (1988-98)

	Change in			
	Industry Composition	Incidence of Part-Time Work	Average Earnings Within Industries	Total Change
State Factors	$192	($33)	$3.185	$3.343
National Factors	($1000)	$414	$2,590	$2,004
TOTAL	($808)	$381	$5.775	$5.348

*In 1996 dollars.

From 1988 to 1998, the proportion of part-time work in Washington declined at the same rate as that in the U.S. as a whole. Consequently, the incidence of part-time working produced a modest positive effect on real average earnings in the state.

As in the 1979-88 period, the biggest contributor to the change in Washington average earnings since 1988 was the earnings changes within industries. In a reversal of the trend from 1979 to 1988, real average earnings in Washington grew in most sectors of the state economy and also exceeded those in the U.S. in most industry sectors. Between 1988 and 1998, Washington real average earnings increased by $5,775 due to changes in this component. More than half of this increase could be attributed to unique state conditions and the remaining 45 percent to national factors.

Some Explanations for the Earnings Changes

There are many possible explanations of the causes of earnings changes. Analysis of the nationwide survey data and other more detailed information is required for a better understanding of the earnings changes in the state. However, based on aggregate level employment and earnings data presented here and other similar data analyzed at the national level, the following factors appear critical in affecting the earning changes:

- **National factors in the change in industry composition –** Over the past 20 years, high-paying jobs were lost as many U.S. manufacturing industries failed to keep an edge over advances abroad in technology, organization, and management. The spread of advanced mass production technologies to countries with less skilled and lower wageworkers, together with the increased global mobility of capital, also resulted in a shift of some production abroad.

Between 1979 and 1988, two monetary developments further eroded the base of high-paying production jobs. The enormous appreciation of the dollar value in relation to foreign currencies in the late 1970s and early 1980s made the cost of U.S. goods much higher abroad and the prices of foreign goods much lower at home. In addition, high real interest rates in the U.S. discouraged domestic investment and depressed the demand for durable goods.

These circumstances exacerbated a long-term decline in manufacturing jobs due to increases in worker productivity. For example, by the late 1980s, Washington's lumber and wood products industry was producing the same amount of lumber as in the late 1970s, with about one-third fewer workers.

- **State factors in the change in industry composition –** The negative effect of industry composition on personal earnings in Washington merely mirrored a nationwide phenomenon. Still, some special circumstances had occurred in the state that either raised or depressed the local earning levels. For example, the termination of Washington Public Power Supply System nuclear reactor construction resulted in the loss of thousands of high-skill, high-wage construction jobs in the early 1980s.
- **State factors in the 1979-88 earnings decline within industry sectors –** For many Washington industries, a large portion of their output is exported. The fortunes of these Washington industries depend heavily upon the markets outside the state. The state economy began the 1980s with relatively high wages, strong labor unions, but dependence on several major manufacturing sectors that were increasingly subject to international competitive pressures. Also, in the 1980s, competitions from other regions of the country against major Washington sectors such as lumber, shipbuilding, and aluminum, placed additional downward pressure on wages in Washington industries.

  Real average wages declined in nearly all sectors of the Washington economy during the 1980s. Productivity gains, which had boosted real wages in the 30 years after World War II, slowed down considerably in the 1970s and 1980s. Competitive international pressures (exacerbated by a rising dollar) also forced businesses to reduce costs and hold down wages. Real wage declines in manufacturing and construction spread to services, retail trade, and other secondary sectors.
- **State factors in the 1988-98 earnings rise within industry sectors –** Since the late 1980s, the employment profiles have changed for many major industries in Washington. High-skilled and high-paid occupations account for an increasing share of jobs in many industrial sectors. For example, in manufacturing, a growing proportion of the employment are professional technicians and engineers, outpacing the growth in supporting staff (i.e., clerks and secretaries) and production/assembly line workers. Consequently, within-the-industry earnings have been rising rapidly and have contributed to a significant increase in average aggregate earnings in the state. The soaring equity market in the second half of the 1990s has contributed substantially to the earnings of workers in the state's growing high-tech industries (namely, software, e-commerce, and biotechnology), whereas vested stock options comprise a major portion of employee compensation.

APPENDIX 4-A
DECOMPOSITION OF AVERAGE EARNINGS

	Change in Industry Composition	Change in Average Earnings Within Industries	Change in Incidence of Part-Time Work	Total Change
State Factors	Sc	Sw	Spt	Stot=Sc+Sw+Spt
National Factors	Nc	Nw	Npt	Ntot=Nc+Nw+Npt
Total	Ctot=Sc+Nc	Wtot=Sw+Nw	PTtot=Spt+Npt	CHtot=Ctot+Wtot+PTtot

Ctot =

Σ[AVEARNfte79 *SHARE79*EMPtot79* PTpct79*0.5] + [AVEARNfte79*SHARE79*EMPtot79*(1-PTpct79)*1.0]/EMPtot79 -

Σ[AVEARNfte79 ***SHARE88*EMPtot88*** PTpct79*0.5] + [AVEARNfte79***SHARE88*EMPtot88***(1-PTpct79)*1.0]/**EMPtot88**

Nc =

Σ[AVEARNfte79 *SHARE79*EMPtot79* PTpct79*0.5] + [AVEARNfte79*SHARE79*EMPtot79*(1-PTpct79)*1.0]/EMPtot79

Σ[AVEARNfte79 ***NSHARE88*EMPtot88*** PTpct79*0.5] + [AVEARNfte79***NSHARE88*EMPtot88***(1-PTpct79)*1.0]/**EMPtot88**

Sc = Ctot-Nc

Wtot =

Σ[AVEARNfte79 *SHARE79*EMPtot79* PTpct79*0.5] + [AVEARNfte79*SHARE79*EMPtot79*(1-PTpct79)*1.0]/EMPtot79 -

Σ[**AVEARNfte88** *SHARE79***EMPtot88*** PTpct79*0.5] + [**AVEARNfte88***SHARE79***EMPtot88***(1-PTpct79)*1.0]/**EMPtot88**

Nw =

Σ[AVEARNfte79 *SHARE79*EMPtot79* PTpct79*0.5] + [AVEARNfte79*SHARE79*EMPtot79*(1-PTpct79)*1.0]/EMPtot79

Σ[**NAVEARNfte88** *SHARE79***EMPtot88*** PTpct79*0.5] + [**NAVEARNfte88***SHARE79***EMPtot88***(1-PTpct79)*1.0]/**EMPtot88**

Sw = Wtot-Nw

PTtot =

Σ[AVEARNfte79 *SHARE79*EMPtot79* PTpct79*0.5] + [AVEARNfte79*SHARE79*EMPtot79*(1 PTpct79)*1.0]/EMPtot79 -

Σ[AVEARNfte79 *SHARE79***EMPtot88* PTpct88***0.5] + [AVEARNfte79*SHARE79***EMPtot88*(1-PTpct88)***1.0]/**EMPtot88**

Npt =

Σ[AVEARNfte79 *SHARE79*EMPtot79* PTpct79*0.5] + [AVEARNfte79*SHARE79*EMPtot79*(1-PTpct79)*1.0]/EMPtot79

Σ[AVEARNfte79 *SHARE79***EMPtot88*NPTpct88***0.5] + [AVEARNfte79*SHARE79***EMPtot88*(1-NPTpct88)***1.0]/**EMPtot88**

Spt = PTtot-Npt